

**Region 7 Superfund Program
Site Addendum for the Generic QAPP for Superfund Site Assessment Activities (October 2012)**

Project Information:

Site Name: <i>West Lake Landfill, MOD079900932</i>		City: <i>Bridgeton</i>	State: <i>MO</i>
EPA Project Manager: <i>Dan Gravatt</i>		START Project Manager: <i>NA</i> <i>U.S. Geological Survey, Missouri Water Science Center</i>	
Approved By:	<i>NA</i>		
Title:	<i>USGS Project Manager</i> <i>John Schumacher</i>	Date:	Prepared For: <i>EPA Region 7 Superfund Division</i>
Approved By:			
Title:	<i>USGS Center Director (Missouri Water)</i> <i>Mike Slifer</i>	Date:	Prepared By: <i>John Schumacher</i> <i>U.S. Geological Survey Missouri Water Science Center</i> <i>1400 Independence Road</i> <i>Rolla, MO 65401</i> Date: <i>August 27, 2013</i>
Approved By:	<i>NA</i>		
Title:	<i>USGS QA Manager</i> <i>Myia Barr</i>	Date:	
Approved By:	<i>Dan Gravatt</i>		
Title:	<i>EPA Project Manager</i>	Date:	START Contractor: <i>NA</i> START Project Number: <i>NA</i>
Approved By:			
Title:	<i>EPA Regional Quality Assurance Manager</i>	Date:	

1.0 Project Management:

1.1 Distribution List

EPA--Region 7: *Dan Gravatt* *John Schumacher*
EPA Project Manager; EPA *USGS Project Manager*
Diane Harris
EPA RQAM

1.2 Project/Task Organization

Dan Gravatt is the EPA Project Manager
John Schumacher is the USGS Missouri Water Science Center (MWSC) Project Manager
Mike Slifer is the USGS Missouri Water Science Director and responsible for all MWSC activities including projects under this QAPP
Paul Brenden is the USGS field team leader (project hydrologic technician).

1.3 Problem Definition/Background:

Description: This addendum to the site-specific Quality Assurance Project Plan form has been prepared by the USGS. The site specific QAPP for Offsite sampling at the Westlake Landfill was prepared as an addendum to the **Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (Updated: October 2012)** and contains site-specific data quality objectives for the sampling activities described herein.

The EPA desires to characterize naturally occurring background levels of radionuclides and other chemical constituents in the alluvial and bedrock aquifers surrounding the West Lake Landfill in Bridgeton / Earth City, MO, adjacent to the Missouri river. As part of this effort the EPA has requested assistance from the USGS. During June, 2013, the USGS conducted a search of USGS and MDNR and made a field reconnaissance on June 25, 2013. The field reconnaissance identified 7 private bedrock wells and 9 alluvial wells (with 5 additional alluvial wells possible) within 5-miles of the site that were potential candidates for sampling to establish background levels of chemical constituents. In July, 2013, the EPA sampled 6 alluvial wells north of the landfill and provided the list wells identified by USGS to the RA contractor for incorporation into their sampling efforts. Unfortunately, the RA contractor was able to obtain permission to sample only two additional alluvial wells south of the site. The EPA is also conducting oversight of the RA contractor sampling of on-site monitoring wells and has need to utilize the USGS contract lab program for split radionuclide samples. . The USGS has two project tasks under this QAPP:

- (1) conduct sampling of existing private wells in the vicinity of the site, and
- (2) collect and provide radionuclide analysis on split water samples during scheduled October 2013 on-site groundwater sampling.

1.4	Project/Task Description:		
	CERCLA APA Report ● Other: Remedial Investigation support	CERCLA SI Pre-CERCLIS Site Screening	Brownfields Assessment Removal Assessment
	Schedule: Field work is scheduled for _____ <i>October-November, 2013</i> _____		

1.5	Quality Objectives and Criteria for Measurement Data:		
	a. Accuracy: b. Precision: c. Representativeness: d. Completeness: e. Comparability: Other Description:	■ Identified in attached table. ■ Identified in attached table. ■ Identified in attached table. ■ Identified in attached table. ■ Identified in attached table.	
<p>*A completeness goal of 50% for obtaining samples from the identified private wells has been established for this project. This goal is low because the wells are private and subject to owner consent. Of the subset of wells where access is obtained for sampling, a completeness goal of 90 percent for all field and laboratory parameters is established. However, if the completeness goal is not met, EPA may still be able to make site Decisions based on any or all of the remaining validated data.</p>			

1.6	Special Training/Certification Requirements:		
	■ OSHA 1910 Special Equipment/Instrument Operator (describe below): na. Other (describe below): na.		

1.7	Documentation and Records:		
	<div style="display: flex; justify-content: space-between;"> <div> ■ Field Sheets ■ Chain of Custody and Analytical Services Request (ASR) ■ Letter Report ■ Photos </div> <div> ■ Well inventory form ■ Access agreement / field logbook entry </div> <div> ■ Site Maps ■ Health and Safety Plan </div> </div> <p>Sample documentation will follow EPA Region 7 SOP 2420.5.</p> <p>Other: Analytical information will be handled according to procedures identified in Table 2.</p>		

2.0 Measurement and Data Acquisition:			
2.1	Sampling Process Design:		
	Random Sampling Search Sampling Screening w/o Definitive Confirmation sample	Transect Sampling Systematic Grid ■ Biased/Judgmental Sampling Systematic Random Sampling Screening w/ Definitive Confirmation	Stratified Random Sampling Definitive Sampling
<p>The proposed sampling scheme for groundwater from private wells will be biased/judgmental, with definitive laboratory analysis, in accordance with procedures included in OSWER Directive 9345.0 -01A, "Guidance for Performing Preliminary Assessments Under CERCLA", dated September 1991, EPA/540/G-91/013; OSWER Directive 9345.1 -05, "Guidance for Performing Site Inspections Under CERCLA", dated September 1992, EPA/540 -R-92-021.</p> <p>For Task1 (private offsite wells), samples will be collected for major and trace inorganic constituents (including metals), nutrients, VOCs, and radionuclides (isotopes of uranium, thorium, and radium), subject to access being granted by the owners. These analyses are the same as those being used for monitoring well samples collected from the Westlake site. All samples will be analyzed by the USGS National Water Quality Laboratory, except for total metals and radionuclides which will be analyzed by contract laboratories (Test America in Arvada, CO or Test America in Richmond, WA).</p> <p>For Task 2 (split sampling of onsite monitoring wells), USGS will accompany EPA and RA contractors during the scheduled October, 2013 monitoring well sampling event. The USGS will provide sample containers and process, preserve, and ship samples for isotopic U, Th and Ra to the USGS contract laboratory (Test America, Inc.) in Richmond, Washington. The EPA will collect samples for the remaining analytes which will be determined at the EPA Region 7 laboratory.</p>			
	Sample Summary Location	Matrix	# of Samples*
	Analysis		

Task 1- Private wells within about 6 miles of the site with bias to shallow (<350 ft deep) bedrock wells.	groundwater	Up to 9 wells	Major and trace cations, major anions, nutrients, VOCs, isotopes of Ra, Th, U.
Task 2- Twelve (12) on -site monitoring wells to be selected by EPA for split sampling/oversight of RA contractor [correct term?] USGS only providing analytical support for radionuclides	Groundwater	12 monitoring wells	Isotopic Ra, Th, U

*NOTE: QC samples are not included with these totals. See Table 1 for a complete sample summary.

2.2 Sample Methods Requirements:

Matrix	Sampling Method	EPA SOP(s)/Methods
Offsite private water supply wells	Groundwater samples will be collected according to standard USGS protocols described in section 4.2 of the USGS National Field Manual. Both filtered and unfiltered metals will be analyzed requiring filtration of samples at the field site. Private wells will be sampled from tap closest to the well, and the well will be purged until at least one well volume has been removed and until field parameters have stabilized.	<i>USGS National Field Manual Section 4.2</i> (http://water.usgs.gov/owq/FieldManual/)
Onsite Monitoring wells	Groundwater samples will be collected according to the approved RA contractor QAPP except that USGS will process and analyze radionuclide samples.	??? Need some input here as to what QAPP the split sampling is conducted under yours or RA contractor ??

2.3 Sample Handling and Custody Requirements:

- Samples will be processed, preserved, labeled, and shipped in accordance with procedures defined in the USGS National Field Manual at <http://water.usgs.gov/owq/FieldManual/>. Sample will be shipped under chain-of-custody to the USGS laboratory or USGS contract laboratory (radionuclides).
- COC will be maintained as directed by Region 7 EPA SOP 2420.4.
- Samples will be accepted according to Region 7 EPA SOP 2420.1
- Other (Describe):

2.4 Analytical Methods Requirements:

- Identified in attached table 1
- Identified in attached Analytical Services Request (ASR) Form
- Other (Describe):

2.5	<p>Quality Control Requirements:</p> <p>Not Applicable Identified in attached table.</p> <ul style="list-style-type: none"> ■ In accordance with the <i>Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (Updated: October 2012)</i>. Describe QC Samples to be collected: <p>For Task 1 (offsite background), one equipment blank using laboratory-grade DI water will be processed. One field replicate sample, and one VOC trip blank per shipment will be processed.</p> <p>For Task 2 no QA samples are planned.</p> <p>Other (Describe):</p>
2.6.	<p>Instrument/Equipment Testing, Inspection, and Maintenance Requirements :</p> <p>Not Applicable</p> <ul style="list-style-type: none"> ■ In accordance with the <i>USGS National Field manual (http://water.usgs.gov/owq/FieldManual/) and Missouri Water Science Center Water-Quality QA Plan (2013)</i>. <p>Other (Describe):</p>
2.7	<p>Instrument Calibration and Frequency:</p> <p>For Tasks 1 and 2, all field meters used for field measurements (pH, specific conductance, dissolved oxygen, turbidity) will be calibrated at least daily according to the USGS National Field Manual and using manufacture procedures. Temperature, specific conductance, pH, and specific conductance will be measured using a YSI-855 or YSI pro-plus multi-parameter meter using a flow-through chamber. Turbidity will be measured using a HACH turbidity meter.</p> <p>Calibration of laboratory equipment will be performed as described in the specific published USGS Analytical schedule or lab code referenced in attached Table 1 and USGS laboratory QAPP available at the USGS National Water Quality website at URL http://www.nwql.cr.usgs.gov/.</p> <p>Other (Describe):</p>
2.8	<p>Inspection/Acceptance Requirements for Supplies and Consumable</p> <p>For Tasks 1 and 2, all sample containers will meet USGS criteria for cleaning procedures for low-level chemical analysis and be provided by the USGS National Water-quality laboratory. Major and trace cations, and radionuclide samples will be preserved to pH <2 using ultrex TM nitric acid. Nutrients will be preserved by chilling. Disposable capsule filters that are supplied by the USGS Nation Water Quality laboratory and certified for use for trace metals and radionuclides will be used for processing dissolved inorganic constituents and radionuclides.</p> <p>Other (Describe):</p>
2.9	<p>Data Acquisition Requirements:</p> <p>Not Applicable</p> <ul style="list-style-type: none"> ■ In accordance with the <i>Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (Updated: October 2012)</i>. <p>Previous data/information pertaining to the site (including other analytical data, reports, photos, maps, etc., which are referenced in this QAPP) have been compiled by EPA and/or contractor(s) from other sources. Some of that data has not been verified by EPA and/or its contractor(s); however, the information will not be used for decision-making purposes by EPA without verification by an independent professional qualified to verify such data/information.</p> <p>Other (Describe):</p>
2.10	<p>Data Management:</p> <ul style="list-style-type: none"> ■ All laboratory data acquired will be managed in accordance with the USGS Missouri Water Science Center Data Management Plan (2010) and Water Quality QA plan (2013) and stored in the USGS National Water Information System (NWIS). <p>Other (Describe):</p>

3.0 Assessment and Oversight:

3.1 Assessment and Response Actions:

Peer Review

Management Review

Field Audit

Lab Audit

- Water-quality data collected and provided by the USGS under tasks 1 and 2 undergo a stringent review process described in the USGS National Field Manual (<http://water.usgs.gov/owq/FieldManual/>) and the USGS National Water Quality Laboratory QA Plan (<http://nwql.usgs.gov/quality.shtml>). Contract laboratory radionuclide data is first reviewed by the contract laboratory according to their QA plan, then the complete data package is reviewed and by the USGS Laboratory. The data is reviewed by the USGS project chief, and finally, the data will be reviewed and approved by the USEPA project chief.

*note -- In addition, for task 2, the USGS will have an external data validator experienced with radionuclide data validate both the USGS contract laboratory radiochemical data packet and the RA contractor radiochemical data packet.

Other (Describe):

3.1A Corrective Action:

- Corrective actions will be taken at the discretion of the EPA project manager, whenever there appears to be problems that could adversely affect data quality and/or resulting decisions affecting future response actions pertaining to the site.

Other (Describe):

3.2 Reports to Management:

Task 1 (offsite sampling) A letter report describing the sampling locations, problems encountered (with resolutions to those problems), and individual analytical results and a summary of the analytical results will be provided for task 1. This will include complete analytical data packages as attachments, from the USGS contract laboratories including reviews of external contract laboratory data by the USGS laboratory will be included.

Task 2 (onsite split sampling for radionuclides) The complete radionuclide data package, including data validation review of the external contract laboratory, will be provided to the USEPA project manager. Because USGS is only providing analytical support for radionuclides, no additional narrative/report is schedule. USGS will prepare a letter report summarizing observations from field split sampling activities for submittal to the EPA project manager.

Reports prepared by the EPA, will be prepared in general accordance with the *Generic Quality Assurance Project Plan for Superfund Integrated Assessment and Targeted Brownfields Assessment Program (Updated: October 2012)*.

- Other (Describe):

4.0 Data Validation and Usability:

4.1 Data Review, Validation, and Verification Requirements:

Identified in attached table.

- Data review and verification will be performed in accordance with standard USGS laboratory QA Plan at <http://nwql.usgs.gov/quality.shtml>. Radionuclide data for both task 1 and task 2 will be validated done by an external independent radiochemical data validator. After validation, the USGS project chief will review all data, QC data, and laboratory validation comments, and review the data in context of known groundwater geochemistry and historical data from the site before transmittal to the EPA project chief. Non-radionuclide data from the USGS laboratory or contract laboratory will not be formally validated other than the USGS laboratory and contract data review.

Other (Describe):

4.2 Validation and Verification Methods:

Identified in attached table.

- Data generated by the USGS National Quality Laboratory will be reviewed and verified according to the laboratory QA Plan at <http://nwql.usgs.gov/quality.shtml> before electronic transmittal to the local USGS office NWIS database.

After review by the USGS laboratory, data is transmitted electronically to the local USGS office and the USGS project chief will reconcile laboratory data with field measurements and field notes according to the Missouri Water Science Center Water Quality QA Plan (2013). This includes comparison of sample dates, times, descriptions on field sheets and any anomalies documented. The USGS project chief also will review results of field replicates, blanks, and laboratory control samples to ensure they are acceptable for transmittal to EPA.

The EPA site manager will inspect the data to provide a final review. The EPA site manager will review the data, if applicable, for laboratory spikes and duplicates, laboratory blanks, and the field blank to ensure that they are acceptable. The EPA site manager will also compare the sample descriptions with the field sheets for consistency and will ensure that any anomalies in the data are appropriately documented.

Other (Describe):

4.3 Reconciliation with User Requirements:

Identified in attached table

- If data quality indicators do not meet the project's requirements as outlined in this QAPP, the data may be discarded and re-sampling or re-analysis of the subject samples may be required by the EPA site manager.

Other (Describe):

Table 1: Sample Summary

Site Name: West Lake Landfill				City: Bridgeton, MO			
USGS Project Manager: J. Schumacher				Activity/ASR #: Background Sampling		Date: October, 2013	
No. of Samples	Matrix	Location	Purpose	Depth or other Description	Requested Analysis	Sampling Method	USGS Analytical Method/SOP
TASK 1 Offsite background Water quality in the alluvial and Bedrock aquifer							
Up to 9	Water	Private wells	Assess background concentrations	Various or unknown	1- Dissolved major & trace inorganics 2- Dissolved Nutrients 3- Total metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, Se, Ag, Tl, V, Zn) ■ 4- Dissolved U, Th, Ra, isotopes 5- Total U, Th, Ra isotopes 6- VOCs	USGS NFM Sec 4.2	1- SH1260 + LC3132 2- SH 2755 3- EPA 200.7 4- LC1472 (Th), LC1366 (U), LC2164 (Ra), LC1364 (Ra) 5- LC2631 (Th), LC2637 (U), LC2789 (Ra), LC2624 (Ra) 6- SH2020
2	Water Blank	Private well Blank	QC To assess reproducibility in lab and contamination from field equipment * sample processing	1-QC Replicate 1-Equipment blank	1- Dissolved major & trace inorganics 2- Dissolved Nutrients 3- Total metals (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Ni, Se, Ag, Tl, V, Zn) ■ 4- Dissolved U, Th, Ra, isotopes 5- Total U, Th, Ra isotopes 6- VOCs	USGS NFM Sec 4.2	1- SH1260 + LC3132 2- SH 2755 3- EPA 200.7 4- LC1472 (Th), LC1366 (U), LC2164 (Ra), LC1364 (Ra) 5- LC2631 (Th), LC2637 (U), LC2789 (Ra), LC2624 (Ra) 6- SH2020
			Assess contamination during shipping	Trip Blank	VOCs only		1- SH2020
TASK 2 Split sampling of RA contractor with EPA R7 (note USGS providing analytical support for radionuclides only)							
12	Water	On-Site Monitoring wells	Verify RA contractor data	Various	1- Dissolved U, Th, Ra, isotopes. ■ 2- Total U, Th, Ra isotopes	Approved RA QAPP with processing, according to USGS NFM Sec 4.2 ^C	1- LC1472 (Th), LC1366 (U), LC2164 (Ra), LC1364 (Ra) 2- LC2631 (Th), LC2637 (U), LC2789 (Ra), LC2624 (Ra)

^{A-} U.S. Geological Survey, variously dated, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A9, available online at <http://pubs.water.usgs.gov/twri9A>.

^{B-} Total metals will be done by USGS contract laboratory (Test America, Inc., in Arvada Colorado), radionuclides are done by Test America, Inc. in Richland, Washington.

- c- For radionuclides, USGS will follow RA approved QAPP for purging and sampling which will be done by the RA contractor, but use USGS sample supplies and USGS processing , and the USGS contract laboratory. Split samples for other analytes will be processed and submitted to the EPA R7 laboratory by EPA field personnel or contractors.

Table 2: Data Quality Objective Summary

Table 2: Data Quality Objective Summary								
Site Name: West Lake Landfill				City: <i>Bridgeton, MO</i>				
START Project Manager: <i>NA</i>				Activity/ASR #: 6163				Date: July, 2013
Analysis	Analytical Method	Data Quality Measurements					Sample Handling Procedures	Data Management Procedures
		Accuracy	Precision	Representativeness	Completeness	Comparability		
WATER (Groundwater, Drinking Water,)								
Task 1 major and trace inorganics, nutrients, VOCs, and isotopic Ra, Th, U	see Table 1	per analytical method	per analytical method	Biased/judgmental sampling based on professional judgment of the sampling team	50% of wells identified, and 90% for all analytes of wells sampled.	Standardized USGS procedures for sample collection and analysis will be used	See Section 2.3 of QAPP	See Section 2.10 of QAPP form
Task 2 Isotopic Ra, Th, U	see Table 1	per analytical method	per analytical method	Locations of split sampling with RA contractor to be determined by EPA project chief. Samples collected in conjunction with EPA	90%;	Standardized USGS procedures for sample processing and analysis will be used. Samples will be collected (well purging) according to approved RA contractor OAPP	See Section 2.3 of QAPP	See Section 2.10 of QAPP form

Sampling Narrative

Introduction

The United States Environmental Protection Agency (EPA) Region 7 has request assistance from the U.S. Geological Survey (USGS) Missouri Water Science Center (MWSC) to (1) identify and conduct sampling of offsite private, commercial, and possibly public-supply wells in the alluvial and shallow bedrock aquifer in the vicinity of the Westlake Landfill site, and (2) provide analytical capability for the radionuclide analysis (isotopes of Ra, Th, and U) of split samples to be collected from onsite monitoring wells as part of the EPA oversight of RA contractor groundwater sampling.

The purpose of the offsite sampling is to provide additional data to assist with the determination of background water quality in the alluvial and shallow bedrock aquifer at the site. The purpose of the onsite sampling is routine EPA oversight of the RA contractor and the EPA will utilize the USGS analytical service contract for isotopic Ra, Th, and U analysis of split samples collected by the EPA and USGS field team.

The Quality Assurance Project Plan (QAPP) identifies the site-specific features and addresses elements of the sampling strategy and analytical methods proposed for this investigation.

Site Location

Bridgeton, MO.

Site Description

Contaminants have been found in the groundwater within the alluvial aquifer and shallow bedrock aquifer beneath the West Lake Landfill, some of which, can also occur naturally in geologic materials, including radium and arsenic. Monitoring wells at the site are in proximity to landfill materials and pumping from a leachate collection system at the adjacent Bridgeton Landfill complicates identification of upgradient wells and, therefore, establishing background water quality using only site data difficult. Nearby private water-supply wells will be sampled to attempt to quantify naturally occurring levels of chemical constituents. The offsite wells will be sampled for dissolved major and trace cations and major anions (Cl, F, SO₄), total metals, total VOCs, and dissolved and total isotopes of Ra, Th, and U.

A review of MDNR and USGS records and a cursory field reconnaissance of the vicinity in June, 2013 confirmed the presence of some private wells in the alluvium and bedrock in the vicinity of the Westlake Landfill site (fig. 1). In July, 2013, the EPA sampled six of the private wells in the alluvial aquifer north of the Westlake site and during August, 2013, the RA contractor sampled two of the alluvial wells south of the site (fig. 1). Because 8 offsite alluvial wells have been sampled, the focus of the USGS task 1 activity will be to locate and sample private bedrock wells in the vicinity of the site. During the June, 2013, reconnaissance, the USGS identified 6 bedrock wells and confirmed that a 7th bedrock well (former public-supply well at the Timbercrest Subdivision) had been abandoned. Wells within a 5-mi (miles) radius of the site with known or suspected completion in the Mississippian-age (Springfield Plateaus aquifer), and in a similar setting of near the end of local flow paths within the bedrock aquifer are preferred. However, based on the paucity of sampling points in this mostly urban area, any bedrock wells identified are candidates for sampling. A map of private alluvial and shallow bedrock wells in the vicinity of the site is provided as figure 1. The USEPA sampled wells C1, C2, C4, C5, C6, and C7 in June and the RA contractor sampled wells

Up to 9 offsite private wells may be sampled with preference given to bedrock wells. At least 6 bedrock wells were identified in the June, 2013 general reconnaissance of the area by the USGS (fig. 1). In addition, the USGS NWIS database includes data from two domestic wells of suitable depth (less than 350 ft) that were sampled in the 1930s and 1940s. A reconnaissance of the former locations of these two older wells will be done as well as a review of 1950s era topographic maps to identify older homes.

Previous Investigations

The USGS provided the list of all wells identified by the USGS during the June, 2013, to the EPA who shared the list with the RA contractor. During July, 2013, the USEPA was able to get permission to sample 6 of 7 private wells completed in the Missouri River alluvium located north of the site. In August, 2013, the RA contractor was able to obtain permission to sample two alluvial wells south of the site (fig. 1) but refused access to sample the remaining alluvial or bedrock wells. The EPA has asked the USGS to attempt to obtain permission to sample the remaining wells and locate additional wells in the area that might be sampled for determining background water quality..

Sampling Strategy and Methodology

The groundwater samples from the wells will be collected from taps/spigots located nearest the wellhead and prior to any in-home water treatment system. The wells will be purged according to protocols for sampling in the USGS National Field Manual (<http://nwql.usgs.gov/quality.shtml>). Purging general will be done to remove at least one well volume (estimated) and until field parameters of temperature (within 0.5 degrees C), specific conductance (within 2 percent), pH (within 0.25 units) are stable over three consecutive readings taken no less than 0.2 well volumes apart.

An abbreviated USGS well inventory field sheet (attached) will be completed to document each groundwater sample location. In addition, a ground-water water quality field sheet (attached) is completed for each groundwater sample to document well purging, field measurements, and sampling information. Water samples will be processed and preserved and shipped to the USGS National Water Quality Laboratory (dissolved major and trace inorganics, nutrients, VOCs), the USGS contract laboratory in Arvada, Colorado (total metals), or the USGS contract laboratory in Richland, Washington (radionuclides).

Quality Control Samples

Task 1: To evaluate contamination during sample collection and processing, a field equipment blank will be processed at one well sample site using inorganic blank water or VOC-free pesticide grade water (VOCs). A field replicate sample also will be collected from one well and analyzed for all analytes. A trip blank (supplied by the USGS laboratory) also will be included with each VOC shipment to track possible contamination during shipping.

Task 2: USGS is only providing analytical support for radionuclides for the routine EPA R7 oversight/split sampling of the RA contractor monitoring well sampling. USGS will accompany EPA oversight personnel and provide bottles, and process, preserve, and ship the radionuclide samples.

Analytical Methods

All samples will be analyzed by published EPA methods (radionuclides, and total metals) or published USGS methods that are standard EPA or modified EPA methods. Standard reporting levels will be used. USGS VOC reporting levels are in the 0.2 ug/L range for most analytes, 1 ug/L or less for most dissolved metals, 0.5 mg/L for major cations and anions, and 0.1 mg/L or less for nutrients. Copies of the USGS laboratory schedules and lab codes with reporting levels and method codes are attached. A standard USGS analytical services request form (generated electronically) will be utilized for all samples.

References

- U.S. Geological Survey, variously dated, National field manual for the collection of water-quality data: U.S. Geological Survey Techniques of Water-Resources Investigations, book 9, chaps. A1-A9, available online at <http://pubs.water.usgs.gov/twri9A>.
- U.S. Geological Survey, Missouri Water Science Center, 2012, Quality Assurance Plan, Missouri Water Science Center water-quality activities: 23 p.
- U.S. Geological Survey, Missouri Water Science Center, 2010, Missouri Water Science Center data management plan, 9 p.

DRAFT

Analyte	Source	Lab Code	Parameter				RL	Unit	RL Type	NELAP	
			Code	Method	CAS Number	Cert				Container ID	
USGS SH 2160											
Antimony	U	1785	1095	PLM43	7440-36-0	0.027	ug/L	LTMDL			53 (FA)
Arsenic	U	3122	1000	PLM10	7440-38-2	0.04	ug/L	ltmdl			53 (FA)
Barium	U	641	1005	PLA11	7440-39-3	0.3	ug/L	ltmdl			53 (FA)
Beryllium	U	655	1010	PLA11	7440-41-7	0.1	ug/L	ltmdl			53 (FA)
Boron	U	2110	1020	PLA13	7440-42-8	1	ug/L	ltmdl			53 (FA)
Cadmium	U	1788	1025	PLM43	7440-43-9	0.016	ug/L	LTMDL			53 (FA)
Calcium	U	659	915	PLA11	7440-70-2	0.022	mg/L	ltmdl			53 (FA)
Chloride	U	1571	940	IC022	16887-00-6	0.06	mg/L	ltmdl	C		55 (FU)
Chromium	U	3126	1030	PLM10	7440-47-3	0.07	ug/L	ltmdl			53 (FA)
Cobalt	U	3124	1035	PLM10	7440-48-4	0.023	ug/L	ltmdl			53 (FA)
Copper	U	3128	1040	PLM10	7440-50-8	0.8	ug/L	ltmdl			53 (FA)
Fluoride	U	651	950	IC003	16984-48-8	0.04	mg/L	ltmdl			55 (FU)
ICP Mass Spectrometry (ICPMS) setup	U	2181	L2181				unsp	mrl			53 (FA)
Inductively coupled plasma (ICP) setup	U	2002	L2002				unsp	lrl			53 (FA)
Iron	U	645	1046	PLA11	7439-89-6	4	ug/L	ltmdl			53 (FA)
Lead	U	1792	1049	PLM43	7439-92-1	0.025	ug/L	ltmdl			53 (FA)
Lithium	U	664	1130	PLA11	7439-93-2	0.05	ug/L	ltmdl			53 (FA)
Magnesium	U	663	925	PLA11	7439-95-4	0.011	mg/L	ltmdl			53 (FA)
Manganese	U	1793	1056	PLM43	7439-96-5	0.15	ug/L	ltmdl			53 (FA)
Molybdenum	U	1794	1060	PLM43	7439-98-7	0.014	ug/L	LTMDL			53 (FA)
Nickel	U	3130	1065	PLM10	7440-02-0	0.09	ug/L	ltmdl			53 (FA)
pH, laboratory	U	68	403	EL006		0.1	pH	mrl			55 (RU)
Potassium	U	2774	935	PLO02	2023695	0.004	mg/L	ltmdl			53 (FA)
Silica	U	667	955	PLA11	7631-86-9	0.018	mg/L	ltmdl			53 (FA)
Silver	U	1796	1075	PLM43	7440-22-4	0.005	ug/L	LTMDL			53 (FA)
Sodium	U	675	930	PLA11	7440-23-5	0.06	mg/L	ltmdl			53 (FA)
specific conductance, laboratory	U	69	90095	WHT03		5	uS/cm	mrl			55 (RU)
Strontium	U	652	1080	PLA11	7440-24-6	0.2	ug/L	ltmdl			53 (FA)
Sulfate	U	1572	945	IC022	14808-79-8	0.09	mg/L	ltmdl	C		55 (FU)
Thallium	U	2508	1057	PLM40	7440-28-0	0.01	ug/L	ltmdl			53 (FA)
Vanadium	U	653	1085	PLA11	7440-62-2	0.6	ug/L	ltmdl			53 (FA)
Zinc	U	3138	1090	PLM10	7440-66-6	1.4	ug/L	ltmdl			53 (FA)

Analyte	Source	Lab Code	Parameter		CAS Number	RL	Unit	RL Type	NELAP	
			Code	Method					Cert	Container ID
Lab Code 3132 Dissolved Selenium										
Selenium	U	3132	1145	PLM10	7782-49-2	0.03	ug/L	ltmdl		53 (FA)
SH 2755 Dissolved Nutrients										
Nitrogen, ammonia as N	U	3116	608	48	7664-41-7	0.01	mg/L	ltmdl	C	54 (FCC)
nitrogen, nitrite	U	3117	613	49	14797-65-0	0.001	mg/L	mdl	C	54 (FCC)
nitrogen, nitrite + nitrate	U	3156	631	RED01		0.04	mg/L	mdl		54 (FCC)
Total nitrogen (NH3+NO2+NO3+Organic), filtered	U	2754	62854	CL063	17778-88-0	0.05	mg/L	ltmdl		54 (FCC)
phosphorus, phosphate, ortho	U	3118	671	48	14265-44-2	0.004	mg/L	ltmdl	C	54 (FCC)
Lab Code 1472 Dissolved Thorium isotopes										
Thorium-228		1472	61738	AS068	14274-82-9	0.4	pCi/L	sslc		1-L FUR
Thorium-230		1472	26503	AS076	14269-63-7	0.4	pCi/L	sslc		1-L FUR
Thorium-232		1472	75976	AS084	7440-29-1	0.4	pCi/L	sslc		1-L FUR
Lab Code 1366 Dissolved Uranium isotopes										
uranium-234		1366	22610	AS089	13966-29-5	0.1	pCi/L	sslc		1-L FUR
uranium-235		1366	22620	AS101	15117-96-1	0.1	pCi/L	sslc		1-L FUR
uranium-238		1366	22603	AS105	7440-61-1	0.1	pCi/L	sslc		1-L FUR
Lab Code 2164 Dissolved Radium-224 and 226 isotopes										
Radium-224		2164	50833	AS056	13233-32-4	1	pCi/L	sslc		1-L FUR
Radium-226		2164	9503	AS060	13982-63-3	1	pCi/L	sslc		1-L FUR
Lab Code 2164 Dissolved Radium-228										
Radium-228		1364	81366	3	15262-20-1	1	pCi/L	sslc		1-L FUR
Lab Code 2631 Total Thorium isotopes										
Thorium-228		2631	22505	AS069	14274-82-9	0.4	pCi/L	sslc		1-L RUR
Thorium-230		2631	26501	AS077	14269-63-7	0.4	pCi/L	sslc		1-L RUR
Thorium-232		2631	22501	AS085	7440-29-1	0.4	pCi/L	sslc		1-L RUR
Lab Code 2637 Total Uranium isotopes										
uranium-234		2637	22606	AS094	13966-29-5	0.1	pCi/L	sslc		1-L RUR
uranium-235		2637	22622	AS102	15117-96-1	0.1	pCi/L	sslc		1-L RUR
uranium-238		2637	22601	AS110	7440-61-1	0.1	pCi/L	sslc		1-L RUR
Lab Code 2164 Dissolved Radium-224 and 226 isotopes										
Radium-224		2789	24501	AS057	13233-32-4	1	pCi/L	sslc		1-L RUR
Radium-226		2789	50838	AS061	13982-63-3	1	pCi/L	sslc		1-L RUR

Analyte	Source	Lab Code	Parameter		CAS Number	RL	Unit	RL Type	NELAP		
			Code	Method					Cert	Container ID	
Lab Code 2624 Total Radium-228											
Radium-228		2624	11501	BC040	15262-20-1	1	pCi/L	sslc			1-L RUR
SH 2020 Volatile Organic Compounds											
1,2,3,4-Tetramethylbenzene			49999	GCM66	488-23-3	0.1	ug/L	lrl			46 (GCV)
1,2,3,5-Tetramethylbenzene			50000	GCM66	527-53-7	0.08	ug/L	lrl			46 (GCV)
2-Butanone			81595	GCM66	78-93-3	1.6	ug/L	lrl			46 (GCV)
trans-1,4-Dichloro-2-butene			73547	GCM66	110-57-6	2	ug/L	irl			46 (GCV)
2-Hexanone			77103	GCM66	591-78-6	0.6	ug/L	lrl			46 (GCV)
4-Methyl-2-pentanone			78133	GCM66	108-10-1	0.32	ug/L	lrl			46 (GCV)
Acetone			81552	GCM66	67-64-1	3.4	ug/L	lrl			46 (GCV)
Acrylonitrile			34215	GCM66	107-13-1	0.56	ug/L	lrl			46 (GCV)
Benzene			34030	GCM66	71-43-2	0.026	ug/L	lrl	C		46 (GCV)
1,2,3-Trichlorobenzene			77613	GCM66	87-61-6	0.06	ug/L	lrl			46 (GCV)
1,2,3-Trimethylbenzene			77221	GCM66	526-73-8	0.06	ug/L	lrl			46 (GCV)
1,2,4-Trichlorobenzene			34551	GCM66	120-82-1	0.08	ug/L	lrl			46 (GCV)
1,4-Bromofluorobenzene (surrogate)			99834	GCM66	460-00-4		pct	lrl			46 (GCV)
Bromobenzene			81555	GCM66	108-86-1	0.022	ug/L	lrl			46 (GCV)
Chlorobenzene			34301	GCM66	108-90-7	0.026	ug/L	lrl	C		46 (GCV)
Ethylbenzene			34371	GCM66	100-41-4	0.036	ug/L	lrl	C		46 (GCV)
1,3-Dichlorobenzene			34566	GCM66	541-73-1	0.024	ug/L	lrl	C		46 (GCV)
Butylbenzene			77342	GCM66	104-51-8	0.08	ug/L	lrl			46 (GCV)
n-Propylbenzene			77224	GCM66	103-65-1	0.036	ug/L	lrl			46 (GCV)
1,2-Dichlorobenzene			34536	GCM66	95-50-1	0.028	ug/L	lrl	C		46 (GCV)
1,4-Dichlorobenzene			34571	GCM66	106-46-7	0.026	ug/L	lrl	C		46 (GCV)
sec-Butylbenzene			77350	GCM66	135-98-8	0.034	ug/L	lrl			46 (GCV)
tert-Butylbenzene			77353	GCM66	98-06-6	0.06	ug/L	lrl			46 (GCV)
Bromoethene			50002	GCM66	593-60-2	0.12	ug/L	lrl			46 (GCV)
Bromoform			32104	GCM66	75-25-2	0.1	ug/L	lrl	C		46 (GCV)
Hexachlorobutadiene			39702	GCM66	87-68-3	0.08	ug/L	lrl			46 (GCV)
Carbon disulfide			77041	GCM66	75-15-0	0.1	ug/L	irl			46 (GCV)
Tetrachloromethane			32102	GCM66	56-23-5	0.06	ug/L	lrl	C		46 (GCV)
Chloroform			32106	GCM66	67-66-3	0.03	ug/L	lrl	C		46 (GCV)
Isopropylbenzene			77223	GCM66	98-82-8	0.042	ug/L	lrl			46 (GCV)

Analyte	Source	Lab Code	Parameter		CAS Number	RL	Unit	RL Type	NELAP	
			Code	Method					Cert	Container ID
1,1,1,2-Tetrachloroethane			77562	GCM66	630-20-6	0.04	ug/L	lrl		46 (GCV)
1,1,1-Trichloroethane			34506	GCM66	71-55-6	0.03	ug/L	lrl	C	46 (GCV)
1,1,2-Trichlorotrifluoroethane			77652	GCM66	76-13-1	0.022	ug/L	lrl		46 (GCV)
1,2-Dibromoethane			77651	GCM66	106-93-4	0.028	ug/L	lrl		46 (GCV)
1,2-Dichloroethane-d4 (surrogate)			99832	GCM66	17060-07-0		pct	lrl		46 (GCV)
1,2-Dichloroethane			32103	GCM66	107-06-2	0.08	ug/L	lrl	C	46 (GCV)
Hexachloroethane			34396	GCM66	67-72-1	0.12	ug/L	lrl		46 (GCV)
1,1,2,2-Tetrachloroethane			34516	GCM66	79-34-5	0.14	ug/L	lrl	C	46 (GCV)
Chloroethane			34311	GCM66	75-00-3	0.06	ug/L	lrl	C	46 (GCV)
Diethyl ether			81576	GCM66	60-29-7	0.1	ug/L	lrl		46 (GCV)
Ethyl tert-butyl ether			50004	GCM66	637-92-3	0.032	ug/L	lrl		46 (GCV)
cis-1,2-Dichloroethylene			77093	GCM66	156-59-2	0.022	ug/L	lrl		46 (GCV)
Tetrachloroethylene			34475	GCM66	127-18-4	0.026	ug/L	lrl	C	46 (GCV)
trans-1,2-Dichloroethylene			34546	GCM66	156-60-5	0.018	ug/L	lrl		46 (GCV)
Trichloroethylene			39180	GCM66	79-01-6	0.022	ug/L	lrl	C	46 (GCV)
1,1-Dichloroethane			34496	GCM66	75-34-3	0.044	ug/L	lrl	C	46 (GCV)
Tetrahydrofuran			81607	GCM66	109-99-9	1.4	ug/L	lrl		46 (GCV)
Diisopropyl ether			81577	GCM66	108-20-3	0.06	ug/L	lrl		46 (GCV)
m- and p-Xylene			85795	GCM66	179601-23-1	0.08	ug/L	lrl	C	46 (GCV)
1,3,5-Trimethylbenzene			77226	GCM66	108-67-8	0.032	ug/L	lrl		46 (GCV)
Ethyl methacrylate			73570	GCM66	97-63-2	0.2	ug/L	lrl		46 (GCV)
Methyl methacrylate			81597	GCM66	80-62-6	0.3	ug/L	lrl		46 (GCV)
Methyl acrylonitrile			81593	GCM66	126-98-7	0.26	ug/L	lrl		46 (GCV)
Bromochloromethane			77297	GCM66	74-97-5	0.06	ug/L	lrl		46 (GCV)
Bromodichloromethane			32101	GCM66	75-27-4	0.034	ug/L	lrl	C	46 (GCV)
Dibromochloromethane			32105	GCM66	124-48-1	0.12	ug/L	lrl	C	46 (GCV)
Dichlorodifluoromethane			34668	GCM66	75-71-8	0.1	ug/L	lrl		46 (GCV)
Trichlorofluoromethane			34488	GCM66	75-69-4	0.06	ug/L	lrl	C	46 (GCV)
Methyl acrylate			49991	GCM66	96-33-3	0.8	ug/L	lrl		46 (GCV)
Bromomethane			34413	GCM66	74-83-9	0.2	ug/L	lrl		46 (GCV)
Chloromethane			34418	GCM66	74-87-3	0.1	ug/L	mrl		46 (GCV)
Methyl iodide			77424	GCM66	74-88-4	0.26	ug/L	lrl		46 (GCV)
tert-Butyl methyl ether			78032	GCM66	1634-04-4	0.1	ug/L	lrl		46 (GCV)

Analyte	Source	Lab Code	Parameter		CAS Number	RL	Unit	RL Type	NELAP	
			Code	Method					Cert	Container ID
Dibromomethane			30217	GCM66	74-95-3	0.05	ug/L	lrl		46 (GCV)
Dichloromethane			34423	GCM66	75-09-2	0.04	ug/L	mrl	C	46 (GCV)
Naphthalene			34696	GCM66	91-20-3	0.18	ug/L	lrl		46 (GCV)
Number of Tentatively Identified Compounds (TICs)			99871	GCM66			no.	lrl		46 (GCV)
o-Xylene			77135	GCM66	95-47-6	0.032	ug/L	lrl	C	46 (GCV)
4-Isopropyl-1-methylbenzene			77356	GCM66	99-87-6	0.06	ug/L	lrl		46 (GCV)
1,2,3-Trichloropropane			77443	GCM66	96-18-4	0.12	ug/L	lrl		46 (GCV)
1,3-Dichloropropane			77173	GCM66	142-28-9	0.06	ug/L	lrl		46 (GCV)
2,2-Dichloropropane			77170	GCM66	594-20-7	0.06	ug/L	lrl		46 (GCV)
1,2-Dibromo-3-chloropropane			82625	GCM66	96-12-8	0.4	ug/L	lrl		46 (GCV)
1,1-Dichloropropene			77168	GCM66	563-58-6	0.04	ug/L	lrl		46 (GCV)
3-Chloropropene			78109	GCM66	107-05-1	0.08	ug/L	lrl		46 (GCV)
cis-1,3-Dichloropropene			34704	GCM66	10061-01-5	0.1	ug/L	lrl	C	46 (GCV)
trans-1,3-Dichloropropene			34699	GCM66	10061-02-6	0.14	ug/L	lrl	C	46 (GCV)
1,2-Dichloropropane			34541	GCM66	78-87-5	0.026	ug/L	lrl	C	46 (GCV)
1,2,4-Trimethylbenzene			77222	GCM66	95-63-6	0.032	ug/L	lrl		46 (GCV)
Set number			99827	GCM66			no.			46 (GCV)
Styrene			77128	GCM66	100-42-5	0.042	ug/L	lrl		46 (GCV)
tert-Pentyl methyl ether			50005	GCM66	994-05-8	0.06	ug/L	lrl		46 (GCV)
Toluene			34010	GCM66	108-88-3	0.02	ug/L	mrl	C	46 (GCV)
2-Chlorotoluene			77275	GCM66	95-49-8	0.028	ug/L	lrl		46 (GCV)
o-Ethyl toluene			77220	GCM66	611-14-3	0.032	ug/L	lrl		46 (GCV)
4-Chlorotoluene			77277	GCM66	106-43-4	0.042	ug/L	lrl		46 (GCV)
Toluene-d8 (surrogate)			99833	GCM66	2037-26-5		pct	lrl		46 (GCV)
Vinyl chloride			39175	GCM66	75-01-4	0.06	ug/L	lrl	C	46 (GCV)
1,1,2-Trichloroethane			34511	GCM66	79-00-5	0.046	ug/L	irl	C	46 (GCV)
1,1-Dichloroethylene			34501	GCM66	75-35-4	0.022	ug/L	lrl	C	46 (GCV)

MISSOURI WATER-SCIENCE CENTER WELL INVENTORY FORM

Site ID (LAT/LONG/SEQ NO.)

Project Number

GR11SG00EJ80000

Field ID	Party	Date Inventoried	T _____ R _____ Sec _____ Topographic Setting		<div style="text-align: right;">1/4 1/4 1/4</div> <table border="1" style="width:100px; height:100px; margin: auto;"><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>																
Latitude	Longitude	Quad Name	<input type="checkbox"/> Flat	<input type="checkbox"/> Terrace																	
Lat/Long Method M=Map; G=GPS; N=Dig Map	County	Use of water	<input type="checkbox"/> Flood Plain	<input type="checkbox"/> Hill Side																	
Owner		<input type="checkbox"/> Domestic	<input type="checkbox"/> Hill Top	<input type="checkbox"/> Valley Flat																	
Address		<input type="checkbox"/> Public Supply	<input type="checkbox"/> Upland Draw	<input type="checkbox"/> Sink Hole																	
City/ Zip		<input type="checkbox"/> Industrial																			
Phone		<input type="checkbox"/> Irrigation																			
Previous Owner		<input type="checkbox"/> Unused																			
Altitude Method M=Map G=GPS N=DEM	Other - Describe	<input type="checkbox"/> Stock																			
Altitude Land Surface	MP Height	Use of site																			
		<input type="checkbox"/> Observation																			
		<input type="checkbox"/> Withdrawal																			
		<input type="checkbox"/> Unused																			
		<input type="checkbox"/> Other (describe)																			

Well Depth	Casing depth
Casing Material P = PVC; R = Rock/Stone; S = Steel; Other - Describe	
Type of Well Opening X = Open Hole; T = Sand Point; S = Screen; Other - Describe	
Date of Construction	Pump Depth
Driller	
Source of Construction Data O = Owner; R = Reported; D = Driller; A = Other Gov't; S = USGS	

MP Description

Water Level (WL) Measurements

Date	Time	Party	WL Meas	Calib Corr (+/-)	MP Corr (-/+)	WL (bls)	WL Method	Well Status	WL Method E = Estimated A = Airline S = Steel Tape V = Calibrated elect tape Z = Other (describe)

Well Status
D = Dry
F = Flowing
P = Pumping
R = Recently Pumped

Water Samples

Date	Collection point	Start Purge time	End Purge time	Yield	Cond	Temp	pH	DO	Remarks (smell, clarity)

Remarks: [How to access well head, special tools needed (wrenches) sampling location, water softeners, etc.]

Sketch and directions to well location with landmarks (roads, structures) and distances to aid finding well on future visits

--

--



U. S. GEOLOGICAL SURVEY GROUNDWATER QUALITY FIELD NOTES

NWIS RECORD NO _____

Station No. _____ Station Name _____ Field ID _____
Sample Date _____ Mean Sample Time (watch) _____ Time Datum _____ (eg. EST, EDT, UTC)
Sample Medium _____ Sample Type _____ Sample Purpose (71999) _____ Purpose of Site Visit (50280) _____ QC Samples Collected? Y N
Project No. _____ Project Name _____
Sampling Team _____ Team Lead Signature _____ Date _____

FIELD MEASUREMENTS

Property	Parm Code	Method Code	Result	Units	Re-mark Code	Value Qualifier	Null Value Qualifier	NWIS Result-Level Comments
Water Level (see p. 8 for codes and units)								
Flow Rate	00059			gal/min				
Sampling Depth	00003			ft				
Depth to top of sampling interval	72015			ft blw lsd				
Depth to bottom of sampling interval	72016			ft blw lsd				
Temperature, Air	00020	THM04 (thermistor) THM05 (thermometer)		°C				
Temperature, Water	00010	THM01 (thermistor) THM02 (thermometer)		°C				
Specific Conductance	00095	SC001 (contacting sensor)		µS/cm				
Dissolved Oxygen	00300	SPC10 (Spectrophotometer) LUMIN (luminescent) MEMBR (Amperometric)		mg/L				
Barometric Pressure	00025			mm Hg				
pH	00400	PROBE (electrode)		units				
ANC, unfiltered, incremental	00419	TT001		mg/L				
Alkalinity, filtered, incremental	39086	TT013		mg/L				
Carbonate, filtered, incremental	00452	TT019		mg/L				
Bicarbonate, filtered, incremental	00453	TT017		mg/L				
Hydroxide, filtered, incremental	71834	TT023		mg/L				
Turbidity [see attachment for codes]								
Redox potential (Eh)	63002			mvolts				
Hydrogen sulfide odor detected?	71875	SNIF1 (sniff test, acidified sample) SNIF2 (sniff test, non-acidified sample)	#	Yes No	M detect U non-detect			Sample acidified beforehand? yes no
Hydrogen sulfide, unfiltered, measured	99119	ISE01 (electrode) KIT01 (Chemetrics) KIT02 (Hach)		mg/L				
Other								
Other								

SAMPLING INFORMATION

Parameter	Pcode	Value	Information
Sampling Condition*	72006		Sampler/Pump Type (make/model): _____
Sampling Method*	82398		Pump/Sampler ID: _____
Sampler Type*	84164		Sampler Material: stainless steel pvc fluoropolymer other _____
*see p. 8 for values			Tubing Material: fluoropolymer plastic tygon copper other _____
			Filter type(s): capsule disc 142mm 25mm GFF membrane

COMPILED BY: _____ CHECKED BY: _____ LOGGED INTO NWIS BY: _____
Date _____ Date _____ Date _____

SAMPLING CONDITIONS

Aquifer name _____ Depth pump set at: _____ ft blw lsd msl mp

Sampling point description _____

GW Color: *brown gray blue green yellow other* _____GW Clarity: *clear turbid muddy other* _____ Foaming: Yes NoSand Present: Yes No If yes, color of sand: *Black Brown Tan Yellow Gray Other* _____GW Odor: Yes No *describe* _____

Sample in contact with: atmosphere oxygen nitrogen other _____

Weather: **sky-** clear partly cloudy cloudy **precipitation-** none light medium heavy snow sleet rain mist _____**wind-** calm light breeze gusty windy est. wind speed _____ mph **temperature-** very cold cool warm hot

Observations:

Sample Comments (for NWIS; 300 characters max.):

LABORATORY INFORMATION

Sample Set ID _____

SAMPLES COLLECTED:

Nutrients: ___WCA ___FCC ___FCA Major cations: ___FA ___RA Major anions: ___FU Trace elements: ___FA ___RA

Mercury: ___FAM ___RAM ___Wis. Hg Lab Lab pH/SC/ANC: ___RU

VOC: GCV (___ vials) Organics: ___GCC filtered ___ unfiltered ___ C18 ___ Kansas OGRG Lab

Suspended solids: ___SUSO Turbidity: ___TBY

Phenols: ___PHE Oil&Grease: ___OAG Methylene Blue Active Substances: ___MBAS Color: ___RCB

Carbon: ___TPCN ___PIC filter1-vol filtered _____mL filter2-vol filtered _____mL filter3-vol filtered _____mL ___DOC ___TOC

Radon: ___RURCV (Radon sample collection time: _____) Stable isotopes: ___FUS ___RUS

Radiochemicals: ___FUR ___RUR ___SUR ___FAR ___RAR ___RURCT ___BOD ___COD

Other: _____ (Lab _____) Other: _____ (Lab _____) Other: _____ (Lab _____)

Other: _____ (Lab _____) Other: _____ (Lab _____) Other: _____ (Lab _____)

Microbiology: _____ (Lab _____)

Laboratory Schedules: _____

Lab Codes: _____ add/delete _____ add/delete _____ add/delete _____ add/delete _____ add/delete

Comments: _____

Date shipped: _____ Laboratory _____ Date shipped _____ Laboratory _____

Date shipped: _____ Laboratory _____ Date shipped _____ Laboratory _____

****Notify the NWQL in advance if shipping potentially hazardous samples—phone 1-866-ASK-NWQL or email LabLogin@usgs.gov**

Calibrated by: _____ Location: _____
Date: _____ Time: _____

FIELD ID _____

METER CALIBRATIONS/FIELD MEASUREMENTS

TEMPERATURE Meter make/model _____ S/N _____ Thermistor S/N _____ Thermometer ID _____

Calibration criteria: ± 1 percent or ± 0.5 °C for liquid-filled thermometers ± 0.2 °C for thermistors

Local Meter ID: _____

Lab Tested against NIST Thermometer/Thermistor? Y N Date: _____ \pm _____ °C

Measurement Location : FLOW-THRU CHAMBER SINGLE POINT AT _____ ft blw LSD VERTICAL AVG. OF _____ POINTS

Field Readings # 1 _____ #2 _____ #3 _____ #4 _____ #5 _____ MEDIAN: _____ °C Method Code _____ Remark _____ Qualifier _____

pH Meter make/model _____ S/N _____ Electrode No. _____ Type: GEL LIQUID OTHER _____

Sample: FILTERED UNFILTERED FLOW-THRU CHAMBER SINGLE POINT AT _____ ft blw LSD VERTICAL AVG. OF _____ POINTS

pH Buffer	Buffer Temp	Theoretical pH from table	pH Before Adj.	pH After Adj.	Slope	Millivolts
pH 7						
pH 7						
pH 7						
pH _____						
pH _____						
pH _____						
CHECK pH _____						

Temperature correction factors for buffers applied? Y N

Local Meter ID: _____

pH Buffer	Lot No.	Expiration Date
pH 7		
pH 10		
pH 4		

Calibration Criteria: ± 0.1 pH units, ± 0.3 if SC <75us/cm

Field Readings #1 _____ #2 _____ #3 _____ #4 _____ #5 _____ MEDIAN: _____ units Method Code _____ Remark _____ Qualifier _____

SPECIFIC CONDUCTANCE Meter make/model _____ S/N _____ Sensor Type: Dip Flow-thru Other _____

Sample: Flow-thru chamber Single point at _____ ft blw lsd Vertical avg. of _____ points

Local Meter ID: _____

Std Value □ S/cm	Std Temp	SC Before Adj.	SC After Adj.	Std Lot No.	Std type (KCl; NaCl)	Std Exp. Date

Calibration Criteria: ± 5 % for SC ≤ 100 □ S/cm or 3% for SC >100 □ S/cm

AUTO TEMP COMPENSATED METER? Y N
CORRECTION FACTOR APPLIED? Y N
CORRECTION FACTOR= _____

Field Readings #1 _____ #2 _____ #3 _____ #4 _____ #5 _____ MEDIAN: _____ □ s/cm Method Code _____ Remark _____ Qualifier _____

DISSOLVED OXYGEN Meter make/model _____ S/N _____

Sensor Type: Amperometric Luminescent Spectrophotometer Probe No. _____

Local Meter ID: _____

Sample: Flow-thru chamber Single point at _____ ft blw lsd Vertical avg. of _____ points BOD bottle Stirrer Used? Y N

Water-Saturated Air Air-Saturated Water Air Calibration Chamber in Water Air Calibration Chamber in Air Air Saturated Water

Calibration Temp °C	Barometric Pressure mm Hg	DO Table Reading mg/L	Salinity Correction Factor	DO Before Adjustment	DO After Adjustment

Zero DO Check _____ mg/L Adj. to _____ mg/L Date: _____

Zero DO Solution Date _____ Thermistor Check? Y N Date _____

Membrane Changed? N Y N/A Date: _____ Time: _____

Barometer Calibrated? N Y Date: _____ Time: _____

Phase Degrees/Slope/Gain/Scale Factor (100%) _____ (Zero) _____

Calibration Criteria: ± 0.2 mg/L DO saturation _____ %

Field Readings #1 _____ #2 _____ #3 _____ #4 _____ #5 _____ MEDIAN: _____ mg/L Method Code _____ Remark _____ Qualifier _____

FIELD ID _____

TURBIDITY Meter make/model _____ S/N _____ Type: turbidimeter submersible spectrophotometer

Sample: pump discharge line flow-thru chamber single point at _____ ft blw LSD MSL MP Sensor ID _____

Sample: Collection Time: _____ Measurement Time: _____ Measurement: In-situ/On-site Vehicle Office lab NWQL Other _____

Sample diluted? Y N Vol. of dilution water _____ mL Sample volume _____ mL

$$\text{TURBIDITY VALUE} = A \times (B + C) / C$$

where:

A= TURBIDITY VALUE IN DILUTED SAMPLE

B= VOLUME OF DILUTION WATER, mL

C= SAMPLE VOLUME, mL

Calibration Criteria:

≤ 100 Turbidity units ± 0.5 turbidity units or
± 5% of the measured
Value, whichever
is greater

> 100 Turbidity units ± 10%

	Lot Number or Date Prepared	Expiration Date	Concentration (units)	Calibration Temperature °C	Initial instrument reading	Reading after adjustment
Stock Turbidity Standard						
Zero Standard (DM)						
Standard 1						
Standard 2						
Standard 3						

Field Readings #1 _____ #2 _____ #3 _____ #4 _____ #5 _____

MEDIAN _____ Parameter Code _____ FNU NTU NTRU FNMU FNRU FAU FBU AU METHOD CODE _____ Remark _____ Qualifier _____

WELL and WATER-LEVEL INFORMATION

WELL _____ SPRING _____ MONITOR _____ SUPPLY _____ OTHER _____

SUPPLY WELL PRIMARY USE: DOMESTIC _____ PUBLIC SUPPLY _____ IRRIGATION _____ OTHER _____

Casing Material: _____ Altitude (land surface) _____ ft abv MSL

Measuring Point: _____ ft abv blw LSD MSL

Well Depth _____ ft abv blw LSD MSL MP

Sampling condition (72006) pumping (8) flowing (4) static (n/a)

[see reference list for additional fixed-value codes]

Water Level: _____ ft blw LSD (72019) ft blw MP (61055) ft abv MSL (NGVD 1929) (62610)
ft abv MSL (NAVD 1988) (62611) [enter the selected code on p. 1.]

Water Level Method: steel tape electric tape airline other _____

Comments:

Depth to Water and Well Depth

	1ST	2ND	3RD (optional)
Time			
Hold (for DTW)			
- Cut			
= DTW from MP [electric tape reading]			
- Measuring point (MP) (+ if MP below LS)			
= DTW from LSD			
Hold (for well depth)			
+ Length of tape leader			
= Well depth below MP			
- MP (+ if MP below LS)			
= Well depth below LSD			

WATER-LEVEL DATA FOR GWSI

DATE WATER LEVEL MEASURED (C235) _____ - _____ - _____ TIME (C709) _____
Month Day YearWATER LEVEL TYPE
CODE (C243)

L	M	S
below land surface	below meas. pt.	sea level

WATER LEVEL _____ MP SEQUENCE NO. (C248) _____
(C237/241/242) (Mandatory if WL type=M)WATER LEVEL
DATUM (C245)
(Mandatory if WL type=S)

NGVD 29 NAVD 88

National Geodetic
Vertical Datum Of
1929North American
Vertical Datum Of
1988

Other (See GWSI manual for codes)

SITE STATUS
FOR WATER
LEVEL (C238)

A	B	C	D	E	F	G	H	I	J	M	N	O	P	R	S	T	V	W	X	Z
atmos. pressure	tide stage	ice	dry	recently flowing	flowing	nearby flowing	nearby recently flowing	injector site	injector site monitor	plugged measure- ment discontinued	obstruct- tion	pumping	recently pumped	nearby pumping	nearby recently pumped	foreign stance	well des- troyed	affected by surface water	other	

METHOD OF WATER-LEVEL
MEASUREMENT(C239)

A	B	C	E	F	G	H	L	M	N	O	R	S	T	V	Z
airline	analog	calibrated airline	esti- mated	trans- ducer	pressure gage	calibrated pres. gage	geophysi- cal logs	manometer	non-rec. gage	observed	reported	steel tape	electric tape	calibrated elec. tape	other

WATER LEVEL
ACCURACY (C276)

0	1	2	9
foot	tenth	hun- dredth	not to nearest foot

SOURCE OF WATER-LEVEL
DATA (C244)

A	D	G	L	M	O	R	S	Z
other gov't	driller's log	geol- ist	geophysi- cal logs	memory	owner	other reported	reporting agency	other

PERSON MAKING
MEASUREMENT (C246)
(WATER-LEVEL PARTY)

--	--	--	--	--

MEASURING AGENCY (C247)
(SOURCE)

--	--	--	--	--

RECORD READY FOR
WEB (C858)

Y	C	P	L
checked; ready for web display	not checked; no web display	proprietary; no web display	local use only; no web display

Notes/Calculations:

QUALITY-CONTROL INFORMATION**PRESERVATIVE LOT NUMBERS**

7.5N — 7.7N HNO₃ _____ 6N HCl _____ 4.5N H₂SO₄ _____ Conc. H₂SO₄ _____ 1:1 HCl _____
 Exp. Date: _____ Exp. Date: _____ Exp. Date: _____ Exp. Date: _____ Exp. Date: _____
 (METALS&CATIONS) (Hg) (NUTRIENTS&DOC) (COD, PHENOL, O&G) (VOC)

_____ Drops of HCL added to lower pH to ≤ 2
 (NOTE: Maximum number of drops = 5)

BLANK WATER LOT NUMBERS

Inorganic (99200) _____ 2nd Inorganic (99201) _____
 Pesticide (99202) _____ 2nd Pesticide (99203) _____
 VOC/Pesticide (99204) _____ 2nd VOC/Pesticide (99205) _____

Filter Lot Numbers

Filter descriptions with parameter codes require NWIS LOT NUMBERS available at http://www.nwql.cr.usgs.gov/qas.shtml?filters_home

Filter Type	Pore Size (microns)	Manufacturer's Lot Number	Parameter Code	NWIS Lot Number
Capsule	0.45		99206	
Disc	0.45			
142 mm GFF (organics)	0.70			
25 mm GFF (organic carbon)	0.70			
142 mm membrane (inorganics)	0.45			

Starting date for set of samples (99109) (YMMDD) _____ Ending date for set of samples (99110) (YMMDD) _____

QC SAMPLES

Sample Type	NWIS Record No.	Sample Type	NWIS Record No.	Sample Type	NWIS Record No.
Equip Blank _____	_____	Sequential _____	_____	Trip Blank _____	_____
Field Blank _____	_____	Spike _____	_____	Other _____	_____
Split _____	_____	Concurrent _____	_____	Other _____	_____

NWQL Schedules/lab codes (QC Samples) _____

COMMENTS: _____

(Circle appropriate selections)

99100 Blank-solution type

- 10 Inorganic grade (distilled/deionized)
- 40 Pesticide grade (OK for organics and organic carbon)
- 50 Volatile-organic grade (OK for VOCs, organics, and organic carbon)
- 200 Other

99101 Source of blank water

- 10 NWQL
- 40 NIST
- 55 Wisconsin Mercury Lab
- 140 EMD Chemicals
- 150 Ricca Chemical Company
- 200 Other

99105 Replicate-sample type

- 10 Concurrent
- 20 Sequential
- 30 Split
- 40 Split-Concurrent
- 50 Split-Sequential
- 200 Other

99102 Blank-sample type

- 1 Source Solution
- 30 Trip
- 40 Sampler
- 50 Splitter
- 60 Filter
- 70 Preservation
- 80 Equipment (done in non-field environment)
- 90 Ambient
- 100 Field
- 200 Other

99111 QC sample associated with this environmental sample

- 1 No associated QA data
- 10 Blank
- 30 Replicate Sample
- 40 Spike sample
- 100 More than one type of QA sample
- 200 Other

99106 Spike-sample type

- 10 Field
- 20 Lab

99107 Spike-solution source

- 10 NWQL

99108 Spike-solution volume, mL _____

99112 Purpose, Topical QC data

- 1 Routine QC (non-topical)
- 10 Topical for high bias (contamination)
- 20 Topical for low bias (recovery)
- 100 Topical for variability (field equip)
- 110 Topical for variability (field collection)
- 120 Topical for variability (field personnel)
- 130 Topical for variability (field processing)
- 140 Topical for variability (shipping&handling)
- 200 Topical for variability (lab)
- 900 Other topical QC purpose

A complete set of fixed-value codes can be found online at:

<http://www.nwis.er.usgs.gov/currentdocs/index.html>

REFERENCE LIST FOR CODES USED ON THIS FORM

Sample Medium Codes

WG Regular Ground water
WGQ Quality-control sample
(Replicate or Spike)
OAQ Blank

Value Qualifiers

e see field comment
f sample field preparation problem
k counts outside the acceptable range

Null-value Qualifiers

e required equipment not functional or available
f sample discarded; improper filter used
o insufficient amount of water
p sample discarded; improper preservation
q sample discarded; holding time exceeded
r sample ruined in preparation

50280 Purpose of site visit

2001 Primary (primary samples should not exist for a site for more than one date per HIP, and the primary sampling date generally has the highest number of NAWQA analytes)
2002 Supplemental (to fill in missing schedules not sampled or lost)
2003 Temporal characterization (for previously sampled schedules; includes LIP and seasonal samples)
2004 Resample (to verify questionable concentrations in primary sample)
2098 Ground-water quality control
2099 Other (ground-water related samples with medium code other than "6", such as soil samples or core material)

72006 Sampling Condition

0.01 The site was dry (no water level is recorded)
0.02 The site had been flowing recently
0.03 The site was flowing, head could not be measured
0.04 A nearby site that taps the Aquifer was flowing
0.05 Nearby site tapping same Aquifer had been flowing recently
0.06 Injector site
0.07 Injector site monitor
0.08 Measurement discontinued
0.09 Obstruction encountered in well above water surface
0.10 The site was being pumped
0.11 The site had been pumped recently
0.12 Nearby site tapping the same Aquifer was being pumped
0.13 Nearby site tapping the Same Aquifer was pumped recently
0.14 Foreign substance present on the surface of the water
0.16 Water level affected by stage in nearby site
0.17 Other conditions affecting the measured water level
2 Undesignated
4 Flowing
6 Flowing on gas lift
8 Pumping
10 Open hole
18 Producing
19 Circulating
22 Lifting
23 Flowing to Pit
24 Water Flooding
25 Jetting
30 Seeping
31 Nearby well pumping
32 Nearby well taking water
33 Well taking water

A complete set of fixed-value codes can be found online at:

<http://www.nwis.er.usgs.gov/currentdocs/index.html>

71999 Sample purpose

10 Routine
15 NAWQA
50 GW Network
110 Seepage Study
120 Irrigation Effects
130 Recharge
140 Injection

Sample Type Code

9 Regular
7 Replicate
2 Blank
1 Spike

Time Datum Codes

Time Zone	Std Time Code	UTC Offset (hours)	Daylight Time Code	UTC Offset (hours)
Hawaii-Aleutian	HST	-10	HDT	-9
Alaska	AKST	-9	AKDT	-8
Pacific	PST	-8	PDT	-7
Mountain	MST	-7	MDT	-6
Central	CST	-6	CDT	-5
Eastern	EST	-5	EDT	-4
Atlantic	AST	-4	ADT	-3

82398 Sampling method

4010 Thief sampler
4020 Open-top bailer
4025 Double-valve bailer
4030 Suction pump
4040 Submersible pump
4045 Submersible multiple impeller (turbine) pump
4050 Squeeze pump
4060 Gas reciprocating pump
4070 Gas lift
4080 Peristaltic pump
4090 Jet pump
4100 Flowing well
4110 Resin trap collector
8010 Other

84164 Sampler type

4010 Thief Sampler
4020 Open-top Bailer
4025 Double-valve Bailer
4030 Suction Pump
4035 Submersible Centrifugal Pump
4040 Submersible Positive-pressure Pump
4041 Submersible Helical Rotor Pump
4045 Submersible Gear Pump
4050 Bladder Pump
4060 Gas Reciprocating Pump
4070 Gas Lift
4075 Submersible Piston Pump
4080 Peristaltic Pump
4090 Jet pump
4095 Line-Shaft Turbine Pump
4100 Flowing Well
8010 Other

Alkalinity/ANC Parameter Codes

39086 Alkalinity, water, filtered, incremental titration, mg/L
00418 Alkalinity, water, filtered, fixed endpoint, mg/L
29802 Alkalinity, water, filtered, Gran titration, mg/L
00419 ANC, water, unfiltered, incremental titration
00410 ANC, water, unfiltered, fixed endpoint, mg/L
29813 ANC, water, unfiltered, Gran titration, mg/L
29804 Bicarbonate, water, filtered, fixed endpoint, mg/L
63786 Bicarbonate, water, filtered, Gran, mg/L
00453 Bicarbonate, water, filtered, incremental, mg/L
00440 Bicarbonate, water, unfiltered, fixed endpoint, mg/L
00450 Bicarbonate, water, unfiltered, incremental, mg/L
29807 Carbonate, water, filtered, fixed endpoint, mg/L
63788 Carbonate, water, filtered, Gran, mg/L
00452 Carbonate, water, filtered, incremental, mg/L
00445 Carbonate, water, unfiltered, fixed endpoint, mg/L
00447 Carbonate, water, unfiltered, incremental, mg/L
29810 Hydroxide, water, filtered, fixed endpoint, mg/L
71834 Hydroxide, water, filtered, incremental, mg/L
71830 Hydroxide, water, unfiltered, fixed endpoint, mg/L
71832 Hydroxide, water, unfiltered, incremental, mg/L

Dissolved Oxygen

AZIDE Azide-modified Winkler
INDIGO Spectrophotometer, indigo carmine
INDKT Field Kit, indigo carmine, visual
LUMIN Luminescence sensor
MEMB2 Amperometric, Membrane (DODEC)
MEMBR Amperometric, Membrane electrode
RHODA Field Kit, Rhodazine-D, visual
SPC10 Spectrophotometer, Rhodazine-D

71875 Hydrogen Sulfide Odor

Value
none entered (null)
Remark Code Method Code
M detect U un-acidified sample
U non-detect V acidified sample

00003 Sampling depth, ft
78890 Sampling depth, ft blw msl
00059 Flow rate, instantaneous, gallons per minute
72004 Pump or flow period prior to sampling, minutes

Water Level

61055 Water level, depth below measuring point, feet
62610 Ground-water level above NGVD 1929, feet
62611 Ground-water level above NAVD 1988, feet
72019 Depth to water level, feet below land surface

Parameter and method codes for field measurements and turbidity can be found in separate attachments at <http://water.usgs.gov/usgs/owq/Forms.html>

NWIS RECORD NUMBER			LAB USE ONLY
SAMPLE TRACKING ID	User Code	Project Account	NWQL LABORATORY ID

Hazard (please explain): _____

Collected by: _____ Phone No. _____ Date Shipped: _____

WLLFOIA4312 - 001 - 0013966

U.S. GEOLOGICAL SURVEY – ANALYTICAL SERVICES REQUEST (ASR)
For USGS Contract No. 07CRCN0028 with TestAmerica Laboratories (TAL)

SAMPLE IDENTIFICATION

TAL RECORD NUMBER	<div style="border: 1px solid black; height: 20px; width: 100%;"></div>	<div style="border: 1px solid black; height: 20px; width: 100%;"></div>	LAB USE ONLY	
SAMPLE TRACKING ID	User Code	Project Account	LABORATORY ID	
<div style="border: 1px solid black; height: 20px; width: 100%;"></div> STATION ID*	<div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">2 0 1</div> Begin Date (YYYYMMDD)*	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Begin Time*	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Medium code*	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Sample Type
<div style="border: 1px solid black; height: 20px; width: 100%;"></div> USGS Project Contact Name	<div style="border: 1px solid black; height: 20px; width: 100%; text-align: center;">2 0 1</div> End Date (YYYYMMDD)	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> End Time	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> USGS Project Contact Email	

SITE / SAMPLE / PROJECT INFORMATION (Optional)

<div style="border: 1px solid black; height: 20px; width: 100%;"></div> State	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> County	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Geologic Unit Code	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Analysis Status	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Analysis Source	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Hydrologic Condition	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Hydrologic Event	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> 30 days (USGS contract) Turn Around Time Required
---	--	--	---	---	--	--	---

Note: State, County, and Geologic Unit Code data will not be entered in by Contract Laboratory

<div style="border: 1px solid black; height: 20px; width: 100%;"></div> Lisa Uriell 303-736-0103 TAL Name & Ph.no.	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> lisa.uriell@ testamericainc.com TAL Contact Email	<div style="border: 1px solid black; height: 20px; width: 100%;"></div> USGS Project Name
--	---	---

Station Name or Field ID:

Sample conditions or hazards:

ANALYTICAL WORK REQUESTS: SCHEDULES AND CONTRACT ITEM NUMBERS (CINs)

Note: Contract Item Numbers (CINs) are used as Lab Codes for this specific ASR.

Analysis schedule(s)

CIN	Filtered (F) or Unfiltered (U)	Remarks: list analytical method no., specific analytes for metals and anion analyses, special instructions, and other comments	Containers/Preservatives						
			Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	

CHAIN OF CUSTODY RECORD

ASR: Relinquished by:	Date:	Time:
ASR: Received by:	Date:	Time: